Remarks:

Reconsideration of the application is requested.

Claims 1-20 are now in the application. Claims 1, 2, and 11 have been amended. Claims 12-20 have been added.

Support for the newly added claims 12-20 can be found in claims 1-11 as originally filed.

In the second paragraph on page 2 of the above-identified Office action, the drawings have been objected to "because they include ... [a] reference sign(s) [#14] not mentioned in the description." The Examiner is respectfully directed to the last sentence on page 19 ("Adjacent to the substrate layer 2 is a layer ***14***, which is connected to a terminal D." (emphasis added)) disclosing the reference sign 14.

In the fourth paragraph on page 2 of the Office action, claims 1, 2 and 11 have been rejected as being indefinite under 35 U.S.C. § 112, second paragraph.

More specifically, the Examiner has stated that "[c]laims 1 and 11 are indefinite because they refer the semiconductor region surrounding the semiconductor zone like a 'well'". The Examiner's comments have been noted and the phrase "like a

well" was replaced by the phrase "in a well-shape" in claims 1 and 11. The Examiner also stated that "[c]laims 1 and 2 disclose that the semiconductor region be interrupted 'in each case' at at least one location by channels" and that "[i]t is unclear what 'case' is being referred to in this instance." The relevant phrase in claims 1, 2, and 12 has been re-written (each one of said semiconductor regions being interrupted [in each case]).

In the second and third paragraphs on page 3 of the Office action, claims 5 and 6 have been rejected as being indefinite under 35 U.S.C. § 112, second paragraph. More specifically, the Examiner has stated that claims 5 and 6 are "indefinite because [they are] referring to a semiconductor having an edge region. It is unclear what the edge zone is composed of or its usage in the invention." In claim 5 the "channels" are provided in the "edge zone" and in claim 6 an "insulation zone" is provided for shielding charge carriers from the "edge zone". It is believed that these are proper additional limitations further distinguishing the present invention and would be understood by one of ordinary skill in view of the disclosure of the instant application.

It is accordingly believed that the claims meet the requirements of 35 U.S.C. § 112, second paragraph. Should the Examiner find any further objectionable items, Counsel would

appreciate a telephone call during which the matter may be resolved. The above-noted changes to the claim(s) are provided solely for the purpose of satisfying the requirements of 35 U.S.C. § 112. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claim(s) for any reason related to the statutory requirements for a patent.

In the fourth paragraph on page 3 of the Office action, claims 1-3, 5-7, and 10 have been rejected as being obvious over *Nishizawa et al.* (US 5,175,598) in view of *Stengl* (US 5,113,237) under 35 U.S.C. § 103.

In the first paragraph on page 5 of the Office action, claim 4 has been rejected as being obvious over *Nishizawa et al.* and *Stengl* in view of *Siergiej et al.* (US 5,945,701) under 35 U.S.C. § 103.

In the third paragraph on page 5 of the Office action, claims 8 and 9 have been rejected as being obvious over *Nishizawa et al.* and *Stengl* in view of *Notley* (US 5,324,971) under 35 U.S.C. § 103.

In the second paragraph on page 6 of the Office action, claim 11 has been rejected as being obvious over *Nishizawa et al.* in view of *Stengl* under 35 U.S.C. § 103.

As will be explained below, it is believed that the claims were patentable over the cited art in their original form and the claims have, therefore, not been amended to overcome the references.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 12 (similarly claims 1 and 11) calls for, inter alia:

> a semiconductor body having a semiconductor layer of a first conductivity type with a doping concentration greater than 5×10^{13} charge carriers cm^{-3};
>
> a semiconductor zone of a second conductivity type opposite to said semiconductor layer of said first conductivity type;
>
> a pn-junction formed between said semiconductor zone and said semiconductor layer; and
>
> semiconductor regions of the second conductivity type in said semiconductor body, said semiconductor regions ***surrounding*** said semiconductor zone at a respective distance ***except*** for a channel formed of said semiconductor layer, said semiconductor regions having a doping concentration preventing completely depleted of charge carriers upon a reverse-biasing of said pn-junction..

The Examiner stated on page 4, lines 15-17, of the Office action that "Nishizawa discloses all of the limitations except for the semiconductor body having a doping concentration greater than 5 x 10^{13} charge carrier cm^{-3}." The Examiner then applies *Stengl* for disclosing a doping concentration greater than 5 x 10^{13} charge carrier cm^{-3}.

However, *Nishizawa et al.* also do not disclose or suggest one very essential feature of the recited invention. *Nishizawa et al.* do not disclose or suggest a semiconductor region of a second conductivity type ***surrounding*** the semiconductor zone ***except*** for a channel formed of a semiconductor of a first conductivity type. *Nishizawa et al.* state in col. 2, lines 55-59, "there is disposed a … p+ type semiconductor region 3 … so as to surround a plurality of individual portions of the n-type semiconductor layer 4." No "channel" of a ***different*** conductivity type than the surrounding semiconductor region is present in *Nishizawa et al.*. This can also be clearly seen in Fig. 2 of *Nishizawa et al.*.

The inventive concept of the invention of the instant application is to avoid large reverse currents despite high applied voltages by using a semiconductor component having a semiconductor layer with a doping concentration greater than 5 x 10^{13} charge carriers cm^{-3} in combination with a semiconductor region of a second conductivity type ***surrounding*** the

semiconductor zone ***except*** for a channel formed of a semiconductor of a first conductivity type. The applied references neither suggest nor contain the relevant teaching which would suggest such a semiconductor component. Therefore, the invention as recited in claims 1, 11, and 12 of the instant application is also believed not to be obvious over the cited references.

It is accordingly believed to be clear that *Nishizawa et al.* in view of *Stengl* do not suggest the features of claims 1, 11, and 12. Claims 1, 11, and 12 are, therefore, believed to be patentable over the art and since claims 2-10 and 13-20 are ultimately dependent on either of claims 1 and 12, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1-20 are solicited.

Please charge any fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

For Applicants

MN:cgm

April 26, 2002

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Version with markings to show changes made:

Page 1, lines 6-8, --

This application is a continuation of copending International Application No. PCT/DE99/02732, filed September 1, 1999, which designated the United States and which was not published in the English language.--

Claim 1 (amended). A semiconductor component, comprising:

a semiconductor body of a first conductivity type, said semiconductor body having a first doping concentration greater than 5×10^{13} charge carriers cm^{-3} and having a first surface and a second surface, said first and second surfaces being provided opposite from one another;

at least a first electrode disposed on said first surface and at least a second electrode disposed on said second surface;

a semiconductor zone of a second conductivity type opposite to the first conductivity type;

a pn-junction formed between said semiconductor zone of the second conductivity type and said semiconductor body;

at least one of said first and second electrodes being in contact with said semiconductor zone of the second conductivity type;

semiconductor regions of the second conductivity type provided in said semiconductor body;

said semiconductor regions being disposed at a respective distance from said semiconductor zone of the second conductivity type such that said semiconductor regions surround said semiconductor zone of the second conductivity type [like a well] in a well-shape;

each one of said semiconductor regions being interrupted [in each case] at at least one location by channels formed by said semiconductor body; and

said semiconductor regions of the second conductivity type having a second doping concentration such that said semiconductor regions are not completely depleted of charge carriers in case of a reverse-biasing of said pn-junction.

Claim 2 (amended). The semiconductor component according to claim 1, wherein each one of said semiconductor regions of the second conductivity type are interrupted [in each case] at a plurality of locations by said channels formed by said semiconductor body for increasing a reverse voltage.

Claim 11 (amended). A semiconductor configuration, comprising:

a semiconductor component selected from the group consisting of a diode, a MOS transistor and a thyristor;

said semiconductor component including:

a semiconductor body of a first conductivity type, said semiconductor body having a first doping concentration greater than 5×10^{13} charge carriers cm^{-3} and having a first surface and a second surface, said first and second surfaces being provided opposite from one another;

at least a first electrode disposed on said first surface and at least a second electrode disposed on said second surface;

a semiconductor zone of a second conductivity type opposite to the first conductivity type;

a pn-junction formed between said semiconductor zone of the second conductivity type and said semiconductor body;

at least one of said first and second electrodes being in contact with said semiconductor zone of the second conductivity type;

semiconductor regions of the second conductivity type provided in said semiconductor body;

said semiconductor regions being disposed at a respective distance from said semiconductor zone of the second conductivity type such that said semiconductor regions surround said semiconductor zone of the second conductivity type [like a well] in a well-shape;

each one of said semiconductor regions being interrupted [in each case] at at least one location by channels formed by said semiconductor body; and

said semiconductor regions of the second conductivity type having a second doping concentration such that said semiconductor regions are not completely depleted of charge carriers in case of a reverse-biasing of said pn-junction.